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THE PLANT DISEASE REPORTER

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OFFICE OF MYCOLOGY AND DISEASE SURVEY

Vol. XIV June 1, 1930 Number 11

DISEASES OF CEREAL CROPS

WHEAT FLAG SMUT (UROCYSTIS TRITICI) SURVEY

Illinois: One of our inspectors and myself spent Monday, Tuesday and Wednesday in the flag smut area of Logan, Madison and St. Clair Counties. We examined about 100 fields spending from 5 to 15 minutes in each field. We found flag smut in 8 fields, in 7 of them it was very difficult to find and in the 7 only 4 plants were affected. The eighth field however had a very heavy infestation. This field is northeast of Alton. The variety was Red Cross and had been planted several years by the farmer who owned the field.

We found flag smut in but one field in St. Clair County, the other 7 being in Madison County. My impression is that in the old flag smut area, flag smut could probably be found in almost any field if we look for it long enough, but it is not thick enough in any field to be important, unless it is in a field of such varieties as Red Cross or Harvest Queen.

I heard of several farmers in the northwestern part of Madison County who are planting Red Cross. We examined but one of these fields. It was on corn ground and we did not see any flag smut. (P. A. Glenn, May 16)

Missouri: We found two badly infected fields in St. Louis County and a few infected plants in several other fields at rather widely separated points in that county. In our rather limited survey of Warren and St. Charles Counties we were unable to find a single infected plant but I feel confident that there is some smut there, inasmuch as it is rather widespread in Illinois just across the Mississippi and in St. Louis County just across the Missouri River.

Flag smut is yet with us but with the proper stimulation of the extension men and farmers I believe that it can be held in check. A more detailed report will be sent later. (I. T. Scott, May 17)

Kansas: On May 14, Mr. Leker, extension pathologist, and I inspected three fields in Leavenworth County and found flag smut present in every one. We did not have time to check up on it very closely, but it appeared to be scattered throughout the fields. In some parts of the field we found only a trace and in other places the amount present varied from one to as high as 7 per cent. (C. H. Ficke, May 17)

TOBACCO DISEASE SURVEY

Below are given two reports on the tobacco seed-bed surveys mentioned in the Reporter for May 1, page 75.

REPORT ON TOBACCO SEED-BED SURVEY, WEST VIRGINIA, MAY 12-15.

C. R. Orton

Tobacco production in West Virginia is limited to Mason, Cabell, and Wayne Counties along the Ohio River and extends eastward into the adjacent portions of Putnam and Lincoln Counties.

In this territory only White Burley is grown, but there are four strains which are fairly well known throughout the region. Improved Lockwood is probably the most widely grown, with Kelly, Judy's Pride, and Pepper rating in the order named.

Practically all of the tobacco is grown on a small acreage, varying from one-half to three acres, the latter figure being about the maximum planted by any one grower. The average plot would probably not exceed one acre.

The soil is quite variable in this region. The Ohio River bottom soil is alluvial and varies from a sandy loam to a heavy clay but most of the tobacco is grown on the loam soil. Back in the hills to the east of the Ohio River the soil is extremely variable. The seed beds may be located in the woods in Sassafras loam, in Shale soils, in alluvial creek bottom loams, or even in clay soils. The best seed beds were always found in the sandy loam soils.

The weather conditions in 1930 have had a marked influence upon the seed beds. There was practically no rain in April and none in May up to the time the survey started on May 12. Consequently the beds on the best loam soils which retained moisture were the only productive ones. The beds located on hillsides and open pastures were very poor and will not produce enough plants for setting a normal acreage. I would estimate that the acreage would be cut to 60 per cent of the normal judging from the available plants and the reduction in the number of seed beds which resulted from the low prices realized by the growers in 1929. The first rain in six weeks fell May 13 and during the period of the survey local showers fell over most of the district. The rain came too late however to save more than 70 to 75 per cent of the seed beds.

Only about 50 per cent of the growers use any commercial fertilizer in the seed bed. A number use hen manure, and a few mix their seed with commercial fertilizer and seed it in this manner. Only one or two of the growers interviewed practice any fertilization of the plants after the seed has germinated. In a number of cases such an application would have paid well this season. Where commercial fertilizers were used there was a considerable variation in the formulae, especially of the superphosphate, nitrogen varied from 2.5 to 4 per cent. In all cases the rate of application would be considered light. Not a single grower practices seed disinfection, nor were any of them familiar with the practice. I doubt whether any of them have ever practiced it or have any idea of its purpose.

There appears to be some notion that the seed beds should be well removed from the curing sheds. In many cases growers locate the beds long distances from the sheds but they have no clear notion of the reasons for doing so except that they believe it is good general practice. The fact that certain diseases are spread from the old litter around the sheds is unknown to most of the growers in this State.

Spraying is unheard of in the district. Some of the more progressive realize that spraying would protect the seedlings from flea-beetles and I believe that some of them will spray their beds next season.

Screening the seed bed is practiced without exception, most of the growers using a light muslin not heavier than cheese-cloth. In Wayne County I found the regulation tobacco cloth used and the plants in this district were by far the best in the State. It would have paid most of the growers good dividends this season to have used heavier covers which would have aided materially in retaining moisture in the beds which was a limiting factor in the growth of the plants in 90 per cent of the cases.

The purposes of screening are not well understood by most of the growers. They all believe that the young plants must be shaded and some of them realize that the factor of moisture is important and that screening helps conserve it, but few have any realization that screening protects the seedlings from insects which are very important throughout the district.

One of the most general criticisms which I would make regarding seed bed construction in West Virginia pertains to the frames. About 90 per cent of the growers use poles of from 2 to 4 inches in diameter. These are usually newly cut but not banked up and there are many openings through which the insects migrate readily from the weeds outside to the seedlings in the bed. In a very few cases heavy logs, timbers, or planks are used and the frame made fairly tight. There was always less flea-beetle injury in these beds than in the beds constructed with light poles. In one or two cases even poles were not used, the muslin being held in place by pegs drawn through the muslin binding, and the cloth being held off the plants by a board set on edge and running lengthwise through the center of the bed. This method of fastening the cloth is very inefficient in keeping out insects.

Partial soil sterilization is invariably practiced by burning the seed beds with logs or brush. The duration of the burning is variable. Some growers believe that one or two hours is entirely sufficient and that longer burning destroys the soil for the growth of the seedlings. Others say that the beds cannot be burned too much and these growers keep the fires going all day long on the beds. It may be significant that the two beds where root rot was found were burned one and three hours respectively.

In only two of the seed beds inspected was there any disease detected. Thielavia was present but not serious in these two beds. Possibly the chief reason for the general absence of disease was the drought conditions which prevailed throughout April and May. None of the growers recognized damping-off this season and it seems probable that it was a negligible factor. On the other hand

flea-beetles were generally present especially at the margins of the beds near the openings in the frames. This insect undoubtedly has caused considerable damage and will continue to be troublesome more or less throughout the season. Aphis were found in only a few beds and in no cases were they abundant in any bed.

One bed was seen (Salt Rock) which showed about 40 per cent of the plants with albinic leaves. The albinism was confined chiefly to the older leaves and was generally distributed throughout the bed. The roots were healthy and no explanation for this condition was in evidence. Possibly the cause should be attributed to nutritional deficiency.

There appeared to be some correlation between the size and stand of plants and the date of seeding, which varied from January 25 to March 10. In all cases the earlier seeding about February 1 produced much better plants and more uniform stands.

Summarizing the needs in West Virginia for seed bed improvement I would recommend the following:

(1) Locate beds on richer soil and where the soil moisture would be more uniform.

(2) Burn the beds for 4-6 hours at least.

(3) Build tight frames.

(4) Use a better grade of cloth which is less likely to tear and will conserve more of the moisture.

(5) Seed earlier in the season (February 1 was about the best date this year).

(6) Keep weeds cut around the seed beds. This checks insect injury and infection from mosaic which may frequently be introduced from weed hosts.

(7) Spray the seed beds with Bordeaux. The need for this practice in 1930 was most evident from the standpoint of flea-beetle control, but I believe that in other seasons it might be very important from the standpoint of wildfire control.

(8) There is some evidence that fertilization of the seed beds would be decidedly advantageous in many cases. At present it is not generally practiced.

I am indebted especially to Messrs. A. G. Middleton and W. D. Click, County Agents in Mason and Cabell Counties, for their hearty cooperation in making this survey possible in the limited time at my disposal.

TOBACCO SEED BED SURVEY IN NEW YORK

Charles Chupp

On May 20, 1930 in company with Mr. L. H. Woodward, County Agricultural Agent of Chemung County I visited about 20 farms in Chemung and Steuben Counties which included 954 sashes where the plants were up. Only 14 of these farms had tobacco plants that were up so that observation could be made regarding diseases. On only 2 farms was there a disease of any kind. In the remaining places where the plants were growing they were perfectly healthy so far as I could determine. Even no damping-off was present. It is true that in some of the cases there was a lack of stand and in many of the seed beds the plants were very variable in size ranging under the same sash from those that were hardly through the ground to those that had leaves the size of a silver dollar. The farmers all agreed that it was unusual to have such a difference in the size of the plants. In many cases the seed was sown far too thick so that the plants were crowded together.

This would seem to indicate that if later they have wet cloudy weather which favors damping-off they may have this disease in severe form.

Nearly all the seed beds visited were isolated from the tobacco fields. In only two cases were these beds adjoining the place where tobacco was grown either last year or will be grown this year. The average isolation is approximately 10 rods. On most farms the seed beds were near the barn. In nearly all cases the beds were in different locations than they had been in 1929, for the farmers have found from experience that moving the seed bed each year is a very profitable practice. In every case the same lumber and sashes were used for the 1930 beds as had been used in 1929. I saw no new sashes. The type of soil was gravelly loam as one approached Horseheads but more nearly sandy loam as one travelled westward towards Big Flats and Corning. In all cases there was fairly good drainage. In about one-half of the cases a tobacco fertilizer was used in the beds and in most of the others a slight amount of barnyard manure. The growers were unfamiliar with the tobacco fertilizer analysis.

The seed used in this section comes from three sources, either grown locally, imported from Connecticut and called the Connecticut Havana by the men, or obtained from Wisconsin and known as the Wisconsin Havana. They prefer the home-grown first, the Connecticut sources second, and are rather prejudiced against the Wisconsin seed since they are of the opinion that wildfire is likely to be imported from this source. I am not familiar enough with their conditions to know whether this is a true observation. Most of the home-grown seed comes from two or three good growers who fifteen to twenty years ago imported the seed from Connecticut. The present importation of seed is all done by the various tobacco dealers and given out to their contract men. The seed is usually one year old. In only three cases was older seed found. In one case 1924 seed was planted.

Very little of the seed is treated. In only two cases out of 14 did the men treat. They used silver nitrate and treated for ten minutes according to the recommendations given to them in 1929. I think there has been a federal man there recently who advised them to use two 5 minute treatments of silver nitrate and also suggested the use of calomel for the control of wildfire. At least this statement was made by farmers so I am not sure whether they got it correctly. According to the statements of the growers, the reason the remainder do not treat is that they are not bothered with diseases often enough to make it worth while. Just one-half of the men either sprayed or dusted the plants. The spraying was done with 2-2-50 Bordeaux mixture and the dusting with 20-80 copper-lime dust. From observations the dust was applied fairly often and extremely liberally although the distribution was not as good as it might have been.

The rotation with tobacco in nearly all cases is wheat, then clover one year followed by tobacco and again by wheat. The clover grows very luxuriantly in this valley so that the soil is in excellent condition. In all cases they use the tobacco fertilizer recommended by the tobacco dealers and none of the farmers know the analysis of the fertilizer.

In one seed bed there was a trace of what might have been damping-off although there was not enough of it to determine definitely the cause of the injury. On two farms there was very much injury from a leaf spot caused by some bacterium. Apparently it was not wildfire but a type which Mr. Clara of our Department has been working on for several years. He has made isolations and later may be able to determine exactly the type of organism. These two farms have had the same trouble for a number of years. In one case there was one seed bed of 14 sash where approximately 50 per cent of the plants had died or were dying from this spotting. The other seed bed of the same size had only a trace of the injury. In both beds where the trouble occurred it started from a given center and enlarged in a circular manner so that most of the spots ranged from

10 inches to 2 feet in diameter with the plants in the center of the areas entirely dead and those at the margins more or less spotted with a rather soft rot of the leaves. On the neighboring farm there was the same trouble but only two or three small spots about one foot in diameter in a seed bed of 60 sashes.

Every seed bed which we visited had been steam sterilized by the pan method. There are several men in the Big Flats area who have engines and pans and contract at twenty cents a sash for doing the treating. In some cases the treatment is only for 15 minutes but in most cases are prolonged for twenty minutes with about 120 pressure. The growers dimly realize that this is for disease control but do it primarily for weed control since the steam treated flats do not need to be weeded.

On nearly every farm the young tomato plants are grown in the same beds with the tobacco plants. They are scattered at one to two feet intervals. The growers say they do not have any trouble with mosaic on either crop. It would be interesting to see whether there was any more mosaic on the tomatoes grown under such conditions than on those grown separately.

TOBACCO MOSAIC IN NORTH CAROLINA

I have seen 98 beds to date, 12 of which have mosaic plants. One bed was literally full, others had from one to not over 10 plants. Beds varied in size up to 1,500 square yards. Apparently all cases of introduction at time of weeding from use of chewing tobacco and uncontrolled spitting. A few mosaic plants in beds may mean much in crop. (F. A. Wolf, May 24)

DISEASES OF ORNAMENTALS

BROWN ROT (SCLEROTINIA SP.) ON FLOWERING ALMOND

On May 19 I collected flowering twigs of the flowering almond, Prunus japonica Thunb., showing marked symptoms of blossom and twig blight. The blossoms were rotten and soggy, and the leaves were yellow and water-soaked.

Microscopic examination revealed an abundance of Sclerotinia as the evident cause of the blossom blight and probably also of the twig blight. Whether this fungus is S. fructicola (Wint.) Rehm. or S. cinerea (Bon.) Schroet. has not yet been determined. (G. H. Boewe, May 20)

LITERATURE NOTES

PHYTOPHTHORA ROOT ROT OF CALLA LILY

Freeman Weiss reports the occurrence of this disease, caused by Phytophthora (richardiae), on Long Island. The first specimens were received in 1928. Since then it has been found in several greenhouses on Long Island. He states that in-

formation from other sources indicates its presence in New Jersey and probably also in California. It was first described from Holland and later was found in England. The disease was reported to the Survey from New Jersey in 1929.

Weiss, Freeman. A root rot of the white calla new to the United States. Flor. Exch. (New York) 73 (16): 11, 13. illus. April 19, 1930.

DISEASES OF VEGETABLE CROPS

BEAN DISEASES IN LOUISIANA

Observations were made during the week of May 12-19, 1930 on bean diseases in Livingston and Terrebonne, two of the principal bean growing parishes of the state, as well as the experimental plantings at Baton Rouge.

Anthracnose (Colletotrichum lindemuthianum) There was much less of the disease noted this year than usual, probably because of the excessively dry weather of the last several weeks. At the Denham Springs packing sheds, small quantities of infected pods were discarded, principally wax beans. Only an occasional infected pod was noted in the packing sheds at Houma, while the disease was not observed in any of the numerous fields visited.

Blight (Bacterium phaseoli) Blight was found to be quite general in most of the fields where Colorado grown seed were used. From 15 to 25 per cent of the plants showed some leaf infection, but the injury was not very great in most cases. Very little pod spotting was noted. One planting of Black Valentine variety at Baton Rouge was very severely diseased. Practically all the plants were infected, and from 50 to 60 per cent of the pods had blight lesions on them.

Mosaic Only an occasional mosaic infected plant was observed. There was not enough infection to be of any consequence.

Root Rot (Fusarium sp., Rhizoctonia sp., Sclerotium rolfsii). The group of troubles, including root rot as well as the decaying of the base of the stem, is included under the term "root rot". This is the most destructive bean disease this year in the southern part of the state. There is always a certain amount of Rhizoctonia injury, and some plants are killed by Sclerotium rolfsii, but there has been a serious development of what is apparently a Fusarium root rot as well. In certain areas, there were 15 to 20 per cent of the plants killed. The injury was most severe in the heavier, more poorly drained soils, but is not entirely confined to these areas.

(Eugene C. Tims)

SCLEROTIUM ROLFSII ON POTATOES IN ARKANSAS

A severe epidemic of stem rot of Irish potatoes caused by Sclerotium rolfsii has been reported from Prescott, Arkansas. (H. R. Rosen, May 16)

BACTERIAL CANKER OF TOMATO IN MISSISSIPPI

Specimens of this disease (Aplanobacter michiganense) were submitted on May 1-5 from three different locations and a fourth reported from Copiah County. Today we have the report of this disease from Hinds County and the specimens have been verified.

A visit was made to these counties on May 6 to confirm our examinations and cultures. We find the disease even more widespread than had been anticipated. Fortunately for our growers, only a part of them will encur losses from this disease during 1930. Our data indicates that the infected and contaminated seed was introduced from northern seed firms, some of the seed being disease-free while other stocks show a high percentage of infection. The disease is present in the varieties known as Walter Richards, Gulf State Market and Crystal Springs Market. The latter variety had been sent out of Mississippi for increase; this 1929 seed shows much disease to be present while the homegrown stock of the same variety is clean. (L. M. Fenner, May 12)

A SCAB DISEASE OF LIMA BEAN IN CUBA AND PORTO RICO

By Anna E. Jenkins, Associate Pathologist,
Office of Mycology and Disease Survey.

A destructive fungus disease termed scab, affects both bush and pole lima bean (Phaseolus lunatus macrocarpus Benth.) in Cuba and Porto Rico, where it appears to be widely prevalent. Knowledge of this range of the disease is based upon leaves, stems and fruits sent by Professor S. C. Bruner, Estacion Experimental Agronomica, Santiago de las Vegas, Cuba, during the past three years, and upon green unshelled pods received from Cuba and Porto Rico through the Plant Quarantine and Control Administration, United States Department of Agriculture. These latter specimens amounting to over a hundred collections were obtained during the last three months of the shipping season just past (November to March 30, 1930). Specimens were also taken from markets at Washington, D. C. by G. E. Becker of the Plant Quarantine and Control Administration and by the writer. In addition, a specimen is available which was intercepted from a Cuban shipment entered at the port of New York in 1923.

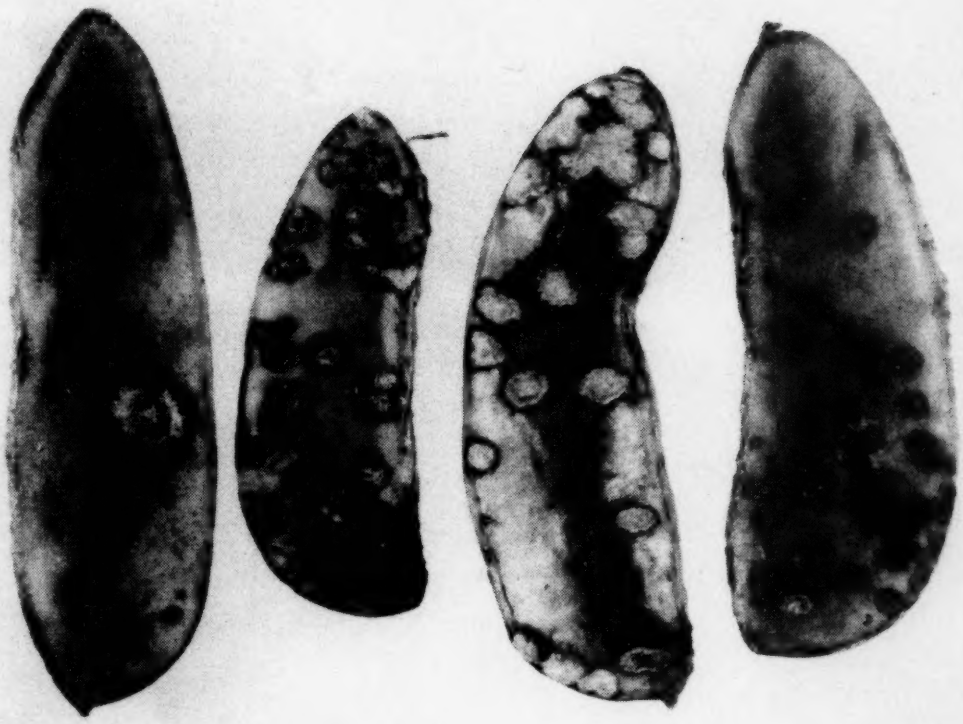
According to Professor Bruner, not less than 75 per cent of the pods in a given field may be affected and not only do they become disfigured by the unsightly spots but also, due to infection of the peduncles, they may wither, fall off, or be prevented from filling out. The many specimens of fresh green pods received during the past shipping season were severely scabbed, but they were generally well filled and in no case were the seeds affected.

The scab lesions which are more or less noticeably thickened or swollen, are produced on leaves, stems and fruits often in great abundance. The leaf spot is usually more pronounced on the upper leaf surface. It is generally circular in outline ranging from a mere dot to an area as large as 4 mm. in diameter. These spots are often uniformly vinaceous buff in color but there may be some admixture of dark brown. The lesions or cankers are often entirely of the first color although they may be bordered by a purplish band of varying width. They may consist of minute roughenings on the stem, or of roundish or elongate cankers of which the longer axis is parallel with the length of the shoot. They may reach a centimeter or more in length, and where confluent may involve the entire stem for a considerable distance. The pod spot is even more noticeable than the leaf or stem lesions (Plate 3). Where the lesions are confluent the entire pod or only one valve may be affected. Immature lesions range from brick red to brownish or pinkish drab at the center with dark brown or dull red border. Older lesions may be lighter at the center or only slightly darker than the leaf lesions with a reddish or maroon border. Sometimes the lesions are of a uniform brilliant red color. Confluent lesions may be variegated.

The fungus causing the disease has now been identified as Elsinoe canavaliae Rac., a species previously known only on Canavalia from the Orient. By quarantine officials both in Cuba and the United States, however, it has been confused heretofore with Colletotrichum lindemuthianum (Sacc. and Magn.) Br. and Cav. Available data show that the fungus has many times been brought into the country on Cuban shipments of green unshelled Limas. Nevertheless, it is not known to be established in continental United States. An effort is being made to learn whether the fungus actually occurs in Lima bean growing regions here. It is suggested that during the present summer, pathologists and others be on the watch for Lima beans infected by this fungus and that suspicious material be submitted for identification.

A fuller report on the disease based upon a study of the specimens referred to above will be published in the near future.

PLATE 3.



Cuban Lima bean pods affected by scab intercepted at New York City, February, 1930. Pods were selected to show various stages in development of lesions. Photograph furnished by Anna E. Jenkins.